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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/065,495	10/24/2002	Ronald Scott Bunker	839-1333	9074
30024	7590	10/15/2004		
NIXON & VANDERHYE P.C./G.E. 1100 N. GLEBE RD. SUITE 800 ARLINGTON, VA 22201			EXAMINER RODRIGUEZ, WILLIAM H	
			ART UNIT 3746	PAPER NUMBER

DATE MAILED: 10/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/065,495	Applicant(s) BUNKER, RONALD SCOTT	
	Examiner William H. Rodriguez	Art Unit 3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 7/29/04 RCE.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 and 8-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

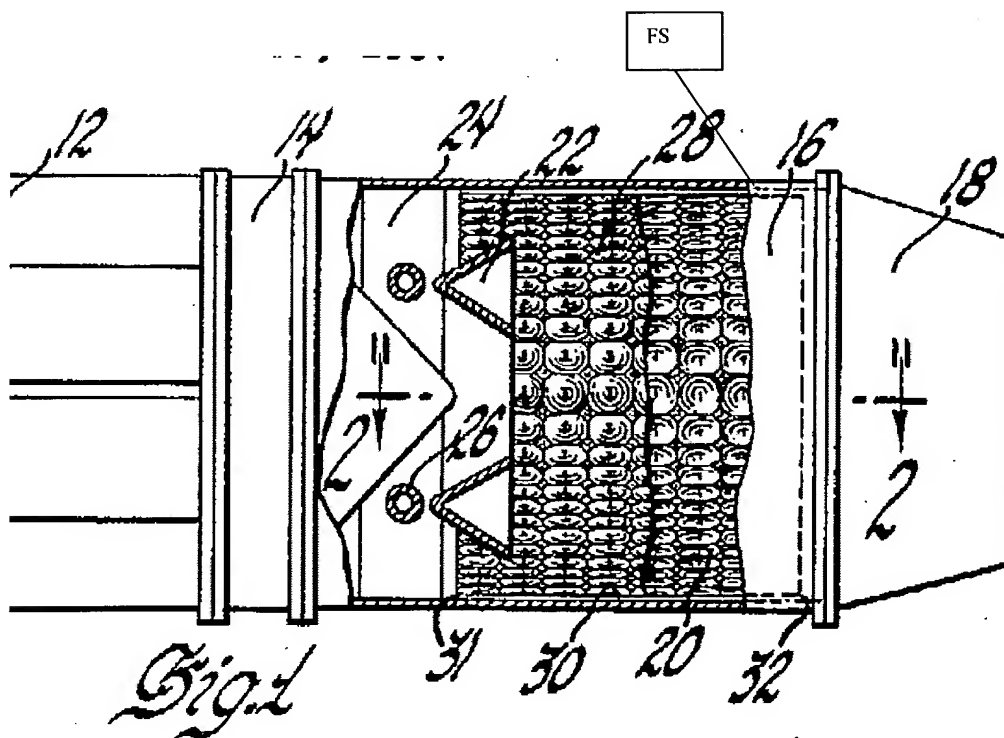
Art Unit: 3746

DETAILED ACTION***Claim Rejections - 35 USC § 103***

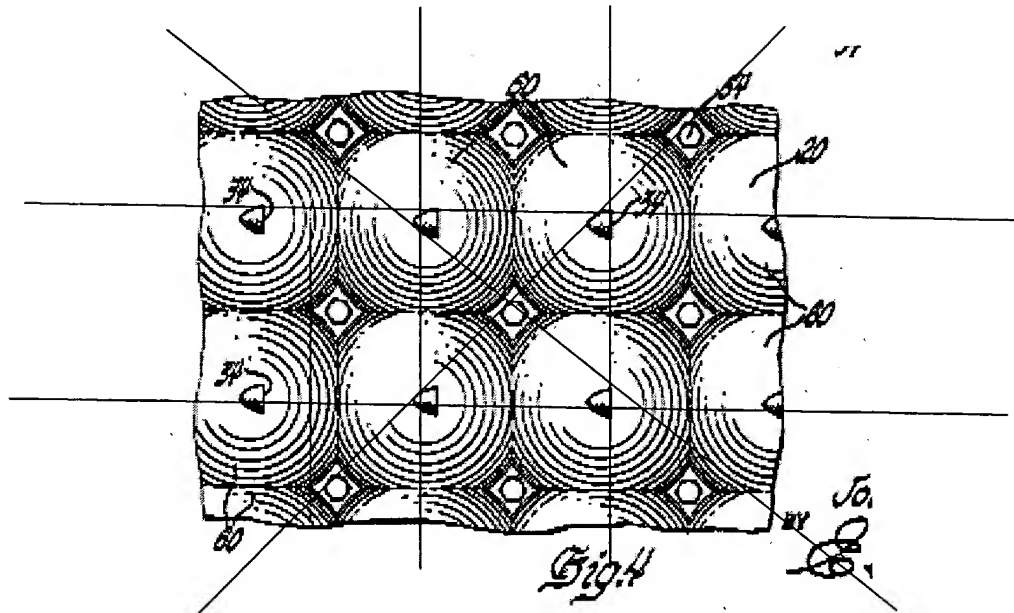
1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-6 and 8-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wetzler (U.S. 2,938,333) in view of Glezer et al. (U.S. 6,098,397).

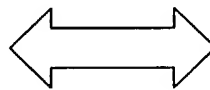
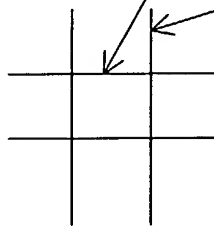


Art Unit: 3746

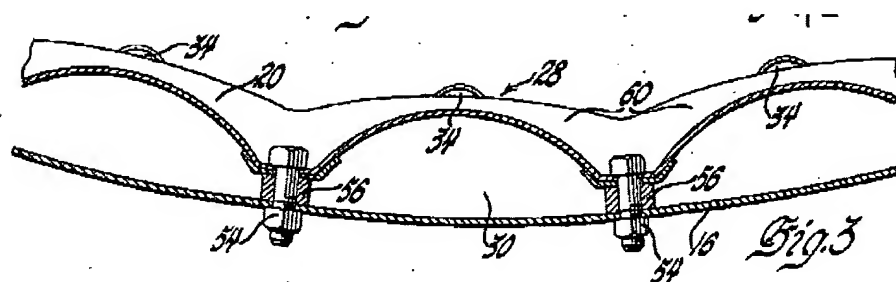
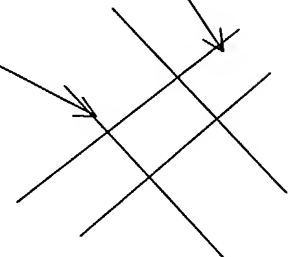


2nd plurality of grooves, going in a different direction—cris-crossed with said 1st plurality of grooves

1st plurality of grooves, going in one direction



OR



protrusions are smoothly curved in cross-section

Art Unit: 3746

With respect to claim 1, **Wetzler** teach a combustor liner 20 for a gas turbine, the combustor liner having a substantially cylindrical shape; and a plurality of axially spaced annular protrusions 60 (cup-like) formed in an outside surface of said combustor liner 20, each protrusion 60 having a uniform cross-section and extending continuously about a circumference of said liner. **Wetzler** does not teach a plurality of axially spaced annular grooves formed in an outside surface of said combustor liner but a plurality of annular protrusions 60. However, **Glezer** teaches a combustor liner 70 similar to Wetzler's liner 20 having a plurality of axially spaced annular grooves 84 formed in an outside surface of said combustor liner 70, wherein each of the grooves 84 have a uniform cross-section. Further, **Glezer et al.** teach that said grooves 84 increase convective cooling without greatly increasing pressure losses as in the case of protruding elements. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used Glezer's teachings and have provided a plurality of grooves 84 instead of protruding elements 60 to Wetzler's liner so as to increase convective cooling without increasing pressure losses. See **Figures 1,4** of Wetzler; and **Figures 2,5** and column 5 lines 12-14 of Glezer et al.

With respect to claim 2, **Wetzler** in view of **Glezer et al.** teach that said grooves 60 are substantially semi-circular in cross-section. See **Figures 1,4** of Wetzler; and **Figures 2,5** of Glezer et al.

With respect to claim 3, **Wetzler** in view of **Glezer et al.** teach that said grooves 60 are arranged transversely to a direction of cooling air flow. See **Figures 1,4** of Wetzler; and **Figures 2,5** of Glezer et al.

Art Unit: 3746

With respect to claims 4-6, **Wetzler** in view of **Glezer et al.** teaches that said grooves have a diameter, a depth and spacing between adjacent grooves. However, these dimensions do not fall between the ranges claimed in the instant application. Nevertheless, selecting a different diameter, depth and spacing between adjacent grooves is a design choice within the level of one of ordinary skill in the art. This selection could have been based on design constraints such as but no limited to: combustor weight (removal of more material, a lighter combustor), quantity of turbulence required to enhance or increase cooling, etc. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected different dimensions for the diameter, depth and spacing of **Wetzler-Glezer's** grooves in order to satisfy certain specific design constraints. See particularly column 4 line 45 to column 5 line 14 of **Glezer et al.**

Note: In practice, the materials used, as well as the shapes and dimensions, can be varied at will according to technical requirements.

With respect to claim 8, **Wetzler** in view of **Glezer et al.** teach that said grooves are 84 angled relative to a direction of cooling air. See **Figures 1,4** of **Wetzler**; and **Figures 2,5** of **Glezer et al.**

With respect to claim 10, **Wetzler** teach a combustor liner 20 for a gas turbine, the combustor liner having a substantially cylindrical shape; and a plurality of axially spaced annular protrusions 60 (cup-like) formed in an outside surface of said combustor liner 20, each protrusion 60 extending continuously about a circumference of said liner, wherein said protrusions are semi-circular in cross-section, and have a diameter D. **Wetzler** does not teach a plurality of axially spaced annular grooves formed in an outside surface of said combustor liner ,

Art Unit: 3746

wherein the depth of said grooves is equal to about 0.05 to 0.50D. However, **Glezer et al.** teach a combustor liner 70 similar to Wetzler's liner 20 having a plurality of axially spaced annular grooves 84 formed in an outside surface of said combustor liner 70. Further, **Glezer et al.** teach that said grooves 84 increase convective cooling without greatly increasing pressure losses as in the case of protruding elements. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used Glezer's teachings and have provided a plurality of grooves 84 instead of protruding elements 60 to Wetzler's liner so as to increase convective cooling without increasing pressure losses. Further, selecting a depth of said grooves 84 is a design choice within the level of one of ordinary skill in the art. This selection could have been based on design constraints or technical requirements such as but not limited to: combustor weight (removal of more material, a lighter combustor), quantity of turbulence required to enhance or increase cooling, etc. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected an appropriate depth for the **Wetzler-Glezer's** grooves in order to satisfy certain specific design constraints. See **Figures 1,4** of Wetzler; and **Figures 2,5** and column 5 lines 12-14 of Glezer et al.

Note: In practice, the materials used, as well as the shapes and dimensions, can be varied at will according to technical requirements.

With respect to claims 11 and 13, **Wetzler** in view of **Glezer et al.** teaches that said grooves have a diameter, a depth and spacing between adjacent grooves. However, these dimensions do not fall between the ranges claimed in the instant application. Nevertheless, selecting a different diameter, depth and spacing between adjacent grooves is a design choice within the level of one of ordinary skill in the art. This selection could have been based on

Art Unit: 3746

design constraints such as but no limited to: combustor weight (removal of more material, a lighter combustor), quantity of turbulence required to enhance or increase cooling, etc. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected different dimensions for the diameter, depth and spacing of **Wetzler-Glezer's** grooves in order to satisfy certain specific design constraints. See particularly column 4 line 45 to column 5 line 14 of Glezer et al.

Note: In practice, the materials used, as well as the shapes and dimensions, can be varied at will according to technical requirements.

With respect to claim 12, **Wetzler** in view of **Glezer et al.** teach that said grooves 60 are substantially semi-circular in cross-section. See **Figures 1,4** of Wetzler; and **Figures 2,5** of Glezer et al.

With respect to claim 14, **Wetzler** in view of **Glezer et al.** teach that said grooves 60 are arranged transversely to a direction of cooling air flow. See **Figures 1,4** of Wetzler; and **Figures 2,5** of Glezer et al.

With respect to claim 15, **Wetzler** in view of **Glezer et al.** teach that said grooves are 84 angled relative to a direction of cooling air. See **Figures 1,4** of Wetzler; and **Figures 2,5** of Glezer et al.

With respect to claims 9 and 16, **Wetzler** teach a combustor for a gas turbine, the combustor including a liner having a substantially cylindrical shape; a flow sleeve FS surrounding said liner; a first plurality of axially spaced circumferential protrusions formed in an outside surface of said combustor liner, angled relative to a direction of cooling air flowing between said liner and said flow sleeve; and a second plurality of circumferential protrusions

Art Unit: 3746

cris-crossed with said first plurality of axially spaced circumferential protrusions, wherein said first and second plurality of axially spaced circumferential protrusions are smoothly curved in cross-section. **Wetzler** does not teach a plurality of axially spaced annular grooves formed in an outside surface of said combustor liner but a plurality of annular protrusions 60. However, **Glezer** teaches a combustor liner 70 similar to Wetzler's liner 20 having a plurality of axially spaced annular grooves 84 formed in an outside surface of said combustor liner 70, wherein the grooves are smoothly curved in cross-section. Further, **Glezer et al.** teach that said grooves 84 increase convective cooling without greatly increasing pressure losses as in the case of protruding elements. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used Glezer's teachings and have provided a plurality of grooves 84 instead of protruding elements 60 to Wetzler's liner so as to increase convective cooling without increasing pressure losses. See **Figures 1,4** of Wetzler; and **Figures 2,5** and column 5 lines 12-14 of Glezer et al.

Contact information

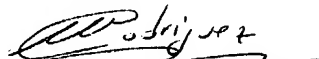
Any inquiry concerning this communication or earlier communications from the examiner should be directed to **William H. Rodriguez** whose telephone number is **703-605-1140 (until 11/22/04) and 571-272-4831 (starting 11/23/04)**. The examiner can normally be reached on Monday-Friday 7:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl J Tyler can be reached on 703-306-2772 (until 11/18/04) and 571-

Art Unit: 3746

272-4834 (starting 11/19/04). The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



William H. Rodriguez
Examiner
Art Unit 3746